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Abstract

Purpose: This paper examines the different ways in which learners may have ownership over technology-enhanced learning by reflecting on technical, legal and psychological ownership.

Design/methodology/approach: The paper uses a variety of examples of technology-enhanced learning ranging from open source software to cloud storage to discuss the three types of ownership.

Findings: It is suggested that learners do not yet own technology-enhanced learning and that, at present, there are different degrees of learner ownership depending on whether technical, legal or psychological ownership are considered.

Originality/value: The discussion presented here is the first to consider all three types of ownership of technology-enhanced learning and demonstrate the complexity of the issue when this broad view is considered.

Keywords

Technical ownership; legal ownership; psychological ownership; digital divide; open source software; cloud storage.

Defining Ownership

To discuss whether learners have ownership over technology-enhanced learning (TEL), it is important to first define exactly what is meant by ownership. The concept of ownership is used within a range of disciplines, including education, but is perhaps most clearly defined within psychology where it is believed to relate to a subjective feeling and can take several forms (Buchem, 2012). Firstly, ownership can take a technical form, for example, owning a piece of equipment or software. Secondly, it can take a legal form, for example, owning the data or copyright on material. Finally, ownership can take a psychological form, which is multi-dimensional incorporating a sense of i) responsibility, ii) identity, iii) accountability, iv) self-efficacy and v) belongingness (Pierce et al., 2001). Within education, ownership of learning corresponds best with the psychological form of ownership because it is generally agreed to require the learners to take personal responsibility for decisions about their own learning (Cooner, 2010; Fleming and Panizzon, 2010,). Chan et al. (2014) suggest these decisions can be in terms of setting clear learning goals, collecting evidence of their learning and actively recruiting and using feedback. Critically, they suggest that learner ownership is closely linked to self-determination and that this can be defined as "acting as the primary causal agent in one's life and making choices and decisions regarding one's quality of life free from undue external influence or interference" (Wehmeyer, 1996, p. 22). In summary, at least three distinct forms of ownership can be defined; technical, legal and psychological. Whilst the latter most closely corresponds to existing views of ownership in education, all three will be considered in this discussion beginning with technical ownership, before implications for practitioners are provided.

Technical Ownership

Recent research suggests that learners now own more internet-capable devices than ever before (Dahlstrom et al., 2015), with both smartphone and laptop ownership at over 90% in student populations. This record level of ownership is unsurprising given that the cost of these devices has reduced considerably, a factor that has also reduced the digital divide in terms of hardware ownership (Green and Hannon, 2007). Whilst students report finding laptops more convenient for many learning activities, they are very receptive to using mobile devices to support their learning (Kukulska-Hulme et al., 2011). Indeed, over 90% of students own multiple devices that can be used for learning with 10% owning six or more

devices (Dahlstrom et al., 2015). Therefore, if we consider technical ownership of TEL to be ownership of suitable devices, the premise is supported; learners do now have ownership of TEL. However, note that the definition of technical ownership provided above also included ownership of relevant software and this component paints a rather different picture.

Software, like the hardware, "has become cheaper, more sophisticated and easier to use" (Green and Hannon, 2007, p.19), meaning that learners are now able to create material in digital format and share it with others easily. Learners clearly see the benefits of this approach citing the value of, for example, the permanency of taking notes using software; access to first hand reports and the speed of learning being improved (Kukulska-Hulme et al., 2011). However, Green and Hannon (2007) suggest that ownership of software is now subject to a greater digital divide than hardware and that not all learners can own software packages that must be purchased. This is in line with my own observations as a practitioner, where psychology and biology students report using freeware versions of Microsoft Office, which can lack some functionality because of the cost of Office. However, personal subscription costs do not necessarily mean that a learner cannot access software because, for example, institutional subscriptions may allow access or software downloads. Even if this is the case, it may still mean that files and work cannot be maintained once institutional access is lost and software cannot be kept updated, for example, upon graduation. Therefore, technical ownership of the software component of TEL is limited. One type of software where these limitations of ownership will not occur, is open source software (OSS) packages such as moodle. OSS packages are normally licensed in a way that allows anybody to use, modify, redistribute and even sell the software, so that on an individual learner basis there is no cost to the OSS (Dougiamas and Taylor, 2003). This type of software will be considered later in the context of psychological ownership.

Legal Ownership

The next type of ownership for consideration is legal ownership. In this context, there are several TEL-supported items which a learner might consider that they legally own, including any materials that they have produced and stored to a cloud, content contributed to a Web 2.0 interface and data about their own learning. These three examples shall be discussed in turn. For material stored to a cloud, the status of this ownership may depend on the type of

TEL that learners use. For example, files stored to different clouds may be associated with different interpretations of ownership. Whittaker (2017) explains that whilst the terms and conditions of companies like dropbox leave ownership with the author ("You retain full ownership to your stuff. We don't claim any ownership to any of it."), this is not the case for all clouds. Google drive, for example, makes no reference to ownership and instead states that "When you upload or otherwise submit content to our Services, you give Google […] a worldwide licence to use, host, store, reproduce, modify, create derivative works […], communicate, publish, publicly perform, publicly display and distribute such content." Although the word ownership is not explicitly used, the terms suggest that it has now passed to the commercial company. Therefore, depending on the commercial supplier used, learners may be, in some cases, unwittingly, handing over ownership of their work when they store it to a cloud.

Ownership of content created in Web 2.0 may be equally as complex. The whole premise of Web 2.0 is that it provides a platform for "content generation, re-purposing and consumption" (Franklin and Harmelen, 2007) and presumes that many people are involved in this process. This means that multiple people may feel that they have ownership of the same content including the owner of the website, the original creator or anyone who contributes an amendment. Franklin and Harmelen (2007) explain that in the UK, at least, copyright to the contributor is automatic once material is contributed but in many cases people are unaware of this and assume everything online is in the public domain. Where content is produced collaboratively there are further complexities in determining distinct contributions, and therefore joint copyright may apply instead. Finally, institutions may claim ownership of materials if they host the Web 2.0 sites, in much the same way they claim intellectual property of findings by their staff. One way in which copyright laws may be simplified is through the Creative Commons. The Commons began in 2001 through a collaboration between two Law Schools and aimed to create a repository of resources, including those for education, which promotes sharing and openness (Westbrook, 2009). The Commons provides a series of standardised licenses in which individual can waive different rights to their work. By providing these licenses, the Commons reduces the costs associated with legal ownership of a creative endeavour, which may increase the possibility of learners having legal ownership over their creations. However, to date there has been no

research about what learners understand about the Creative Commons and, it is quite possible, that as they are not aware of general copyright laws they also do not understand the value of the Commons. In summary, where a learner contributes to content on Web 2.0 they do have legal ownership of it, unless otherwise stated in a policy held by the site provider. However, until the copyright laws, including those in the standardised Creative Commons licenses are better understood, and site host policies are clear, this type of ownership may not have much true currency.

As well as creating content online, learners are responsible for generating a huge amount of data about their learning, much of which is stored online via TEL facilities such as learning management systems. These data, used for learner analytics, includes attendance data, use of resources, grades and patterns of learning (Johnson et al., 2007). There is currently significant debate around the ethical and legal implications of holding such data, including who owns the data (Sclater, 2014). It has been suggested there may be differences in ownership of the data depending on its state, with raw data owned by the individual learner and derived data owned by the institution (Pardo and Siemens, 2014). At present, however, there is little true consensus and no clear legal guidelines, making it impossible to tell whether the learner owns this particularly aspect of TEL.

Psychological Ownership

The final area of ownership to discuss is psychological ownership of TEL, which will be discussed using two examples: OSS and the personal learning environment (PLE).

Open Source Software – dividing theory and practice

Recall from the discussion above that OSS, due to its licensing approach, may have less barriers to technical ownership than other forms of software. However, OSS also represents an interesting example in the debate over whether learners have psychological ownership of TEL. Using moodle as an example, this type of software is used to create virtual learning environments that contain interactive features such as quizzes as well as content delivery. Critical in the context of ownership, however, is that moodle is based on a social constructivist pedagogy, meaning that students are involved in constructing their own learning package (Al-Ajlan and Zedan, 2008). This pedagogic approach is mirrored in the

actual development of the software, because everyone, including learners, can adjust the code underlying moodle and different codes are peer-reviewed and refined by discussion within the community of users (Al-Ajlan and Zedan, 2008). Arguably these features of moodle support a sense of responsibility, accountability and self-efficacy, all of which are required for psychological ownership. There is also evidence that coding in moodle is associated with identity. Costello (2014) interviewed several members of the moodle community and found that the "ability to write good code is important to the identity of several participants" (p. 130). He also suggested that members of the moodle community effectively belong to a community of practice. Given that moodle can allow learners to be fully engaged in its community, this OSS supports learners having psychological ownership of this component of TEL. If this is the case, this is a significant component - by 2007, moodle was the fastest growing open source learning management system in the world (Petschenka et al., 2008) and there were 30,000 moodle sites in 195 countries, translated into 70 different languages (Cole and Foster, 2007). However, although theoretically learners can become members of the moodle community and have psychological ownership over this specific TEL component, the reality paints a different picture. For example, of those interviewed by Costello (2014) none identified as learners, with the majority (40%) being software developers. Similarly, Al-Ajlan and Zedan (2008) state that moodle is complex to use and requires IT expertise, indicating that it may not be accessible to all learners.

Personal Learning Environments – a case for shared ownership

Another area where learners may have the potential to exhibit psychological ownership of TEL is in the construction and use of a PLE. Indeed, PLEs emerged in relation to learner-controlled uses of technologies for learning (Downes, 2007) and according to Schaffert and Hilzensauer, the PLE supports ownership by the learner because in the PLE "content is organised in multiple, Web-based tools, [and] ownership is controlled by the learners themselves and/or (commercial) service providers" (2008, p. 4). The use of the term controlled here is notable because, at least in psychology, control is closely related to ownership (Buchem, 2012) and the two are not always distinguished. There are various definitions of PLE (Sclater, 2008) including that a PLE is simply a collection of tools, but it is most comprehensively defined as "web sites or services were learners are able to produce learning content or reflections and store documentations about their learning processes"

(Schaffert and Hilzensauer, 2008). A few studies have directly examined psychological ownership components and PLEs. For example, Buchem (2012) examined the five elements of psychological ownership in relation to the PLE in a sample of 50 students across three different courses (engineering, economics and media and communication). She found that a sense of responsibility, self-identity and accountability were key components in ePortfolio use supporting psychological ownership. However, she did not find any evidence of a sense of belonging although this maybe because of the type of PLE she focussed on; other studies have suggested that there must be social elements to support a sense of belonging (Kop, 2011; Diaz et al., 2014) and an individual ePortfolio may not support this. No research has directly examined whether self-efficacy arises through PLEs.

The need for a sense of responsibility and accountability within ownership raises an interesting point because where PLEs are constructed by learners, one aspect that the learner can be considered responsible and accountable for is the choice or selection of tools. However, there is evidence to suggest that the choice arises through trial and error, rather than a selection against specific criteria. This approach was also described by Weller (2007) who stated that he built up his PLE by experimenting with tools and rejecting some whilst retaining others. Furthermore, even when a learner selects a set of tools it is likely they do so, in some cases, because of influence from their institution. For example, use of facilities such as OneDrive and Sharepoint may be driven by other users within the institution and software for which the institution has an account may be preferred to ones where an individual must pay. Attwell (2007, cited in Buchem, 2012) examined ownership with a focus on content of ePortfolios rather than choice of tool and he suggested that within this context there are three different possibilities for ownership: i) processes clearly "owned" by the learner (e.g reflections), ii) processes "negotiated" between learners, practitioners and institutions (e.g. assessment), and iii) processes "owned" by the institution (e.g. accrediting and certifying learning). In the case of the PLE, arguably the choice of tools, and even how they are used, may be implicitly or explicitly negotiated between the learner and practitioner or institution because a learner may need to ensure compatibility of systems or availability of support. This indicates that whilst the learner could have complete psychological ownership, they are perhaps more likely to have a shared ownership arising from the negotiations.

Different degrees of ownership

Given the balance of evidence, I would suggest that learners do not yet own technology-enhanced learning and that, at present, there are different degrees of learner ownership depending on whether technical, legal or psychological ownership are considered. Clearly, in terms of devices, hardware is now owned by most learners but there is a significant digital divide around software ownership meaning that technical ownership cannot be assumed for all learners. In terms of legal ownership, clear copyright laws exist which do give leaners ownership of material they contribute but many learners are unaware of what they legally own. Furthermore, learners are also likely to be unaware of what may be owned by the institution or commercial supplier when they upload or store materials on a cloud. Finally, ownership of learners' data is yet unclear. Research into psychological ownership is somewhat lacking but it would seem from the limited evidence available that learners may have the most potential to gain psychological ownership, if they choose to engage with the TEL fully. OSS such as moodle, offers a clear opportunity for learners to have full psychological ownership over TEL, but at present, few seem to engage with it to this extent. Similarly, whilst the PLE offers an opportunity for full psychological ownership, it is more common to find tool selection and use arising from negotiations with institutions or practitioners, meaning learning do not have full responsibility and accountability.

Implications for practitioners

Based on the evidence presented here, there are several practical implications for practitioners. In terms of technical ownership, it is important for practitioners to recognise that there is a software digital divide and, wherever possible, ensure learners can retain ownership of learning, even in the absence of institutional software subscriptions. This could be achieved by guiding students to store resources in formats that can be viewed in freeware and make sure any feedback given by practitioners can be accessed in this way. In terms of legal ownership, it may well be that practitioners are also unclear about ownership of contributions to Web 2.0 and the implications of cloud storage and, they too, should ensure they are familiar with any policies or terms, to allow them to support learners' in understanding this type of ownership. It may even be suitable for guidance on use to be included within programme handbooks or other documentation and an overview of

licenses, including those provided by the Creative Commons to be explained. This may be especially helpful is students are creating resources where Commons' licenses can be built into the software, for example, wordpress blogs. Finally, for psychological ownership, practitioners should recognise that the decisions they make may impact on how much of a sense of ownership learners develop. For example, if students are to develop a sense of belonging in their learning, it is likely that social interaction will be needed with other learners. This need not be conventional face to face social contact, as evidenced by the moodle community. Similarly, where compatible with other demands, such as the need to assess learners in a consistent manner, practitioners should avoid places demands, implicit or otherwise on students which dictate their choices of PLE tools. In doing so, learners may be held more accountable and responsible for their own learning to encourage their ownership. In terms of research, there is a paucity of data investigating the psychological ownership of specific TEL and the area certainly warrants further research.

Concluding remarks

This paper has described and discussed three forms of ownership of technology-enhanced learning. Through discussion of a range of examples, it has become apparent that learners do not currently have full ownership over TEL and the degree of ownership they have depends on the type of ownership considered. Practitioners may better support learner ownership by recognising potential barriers such as the software divide and ensuring learner's accountability and responsibility within learning and teaching.

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